

## **REMARKS**

In the specification, the paragraphs [0018] and [0028] are amended to correct minor editorial problems.

Claims 1, 3, 6, 11, 13, 16, 21, 23, 26, 31, 33, 36 and 41 are amended. Claims 2, 12, 22, 32 and 42 – 45 are canceled. New claims 46 and 47 are added. Claims 1 – 41, 46 and 47 remain in the application

Reconsideration of this application in light of the above amendments and the following remarks is requested.

### **Rejections under 35 U.S.C. §112**

Claims 1, 11, 21, 31, 41 and 42 are rejected as not providing antecedent basis for the recitation of “frequency and phase”. Claims 1, 11, 21 and 31 are amended to provide clear antecedent basis for “frequency and phase”. However, the recitation of “frequency and phase” does not appear in remaining claim 41. Claim 41, as amended, does recite “a phase detector configured to detect a phase difference between first and second phase detector input signals”. This language is believed to be clear. Claim 42 is canceled.

Claim 1, 2-3, 12-13, 23-24 and 32-33 are rejected as needing clarification of the usage of “charge”. Claim 1 is amended to now recite “first charge” and “second charge” and is thus believed to be clear. Similar amendments are made to claims 3, 11, 13, 21, 23, 31, 33. Claims 24 contains no recitation of “charge”. For these reasons, it is believed that claims 1, 3, 11, 13, 21, 23, 24, 31 and 33 are clear. Claim 2, 12, 22, 32 are canceled

Claim 6 is rejected as "it is unclear how the switched capacitor can be disabled". Claim 6 is amended to recite "the switched capacitor filter includes a disabled switched capacitor". The term "disabled" in amended claim 6 is an adjective describing the type of the switched capacitor component. Examples of different types of "disabled switched capacitors" are discussed in the specification in paragraph 22. It is thus believed that amended claim 6 is clear. Claims 12, 26 and 36 are rejected for the same reason. Claim 12 is canceled. Claims 26 and 36 are amended in a manner similar to claim 6 and are thus believed to be clear.

Claim 23 is rejected because "it is unclear how the oscillator can be decoupled since no means for performing the decoupling function is recited" Claim 23 is amended to recite "a second switch that decouples..." and is thus believed to be clear.

Claim 31 is rejected because "the substrate on line 3 is not connected to anything". Claim 31 is amended to recite "a substrate on which the controlled oscillator, phase detector, charge pump, direct path loop filter and integrating path loop filter are situated". It is thus believed that claim 31 is clear.

For all these reasons, it is respectfully requested that rejections under 35 U.S.C. §112 to the claims discussed above be withdrawn.

## **Rejections under 35 U.S.C. §102**

Claim 1, 6-11, 17-20 and 41-45 are rejected under 35 U.S.C. §102 (e) as being anticipated by Lee, et al. (U.S. 6,611,160), hereafter Lee '160.

Amended claim 1 recites:

1. (Currently amended) A method of operating a frequency synthesizer, comprising:
  - detecting a phase difference between an output signal of a controlled oscillator and a reference signal, the output signal exhibiting a frequency and phase;
  - pumping first charge, in response to the phase difference, into a first filter which is configured as a direct path loop filter;
  - pumping second charge, in response to the phase difference, into a second filter having substantially the same topology as the first filter, the second filter being configured as an integrating path loop filter; ~~and~~
  - providing a signal from the first and second filters to the controlled oscillator to control the frequency and phase of the output signal of the controlled oscillator; and
  - decoupling the controlled oscillator from the first filter while first charge is pumped into the first filter.

The PTO provides in MPEP § 2131 that

*"[t]o anticipate a claim, the reference must teach every element of the claim...."*

Therefore, with respect to amended claim 1, to sustain this rejection the Lee '160 patent must contain all of the above claimed elements of the claim. However, contrary to the Office Action's position that all elements are disclosed in the Lee '160 reference, that reference does not disclose "decoupling the controlled oscillator from the first filter while first charge is pumped into the first filter". In one embodiment, this decoupling effectively disconnects the controlled oscillator from the first filter while charge is being

pumped into the loop filter to reduce spurious radiations that can occur during such charge pumping. But Lee '160 does not teach "decoupling the controlled oscillator from the first filter while first charge is pumped into the first filter". Moreover, Lee '160 does not teach "pumping first charge, in response to the phase difference, into a first filter which is configured as a direct path loop filter" and "pumping second charge, in response to the phase difference, into a second filter having substantially the same topology as the first filter, the second filter being configured as an integrating path loop filter", as claimed in applicant's amended claim 1. Therefore, the rejection is not supported by the Lee '160 reference and should be withdrawn.

Amended independent claims 11 and 41 are not anticipated by Lee '160 based on arguments similar to those presented above.

Dependent claims 6-10 and 17-20 are believed to be allowable as depending on the allowable subject matter of the independent claims on which they depend.

For all of these reasons, it is respectfully requested that the rejection under 35 U.S.C. 112 of remaining claims 1, 6-11, 17-20 and 41, as amended, be withdrawn.

### **Rejections Under 35 U.S.C. §103**

Claims 2-5 and 12-16 are rejected under 35 U.S.C. §103 as being unpatentable over Lee, et al. (Lee '160) in view of Maldonado (U.S. 6,819,197), hereafter Maldonado '197. Applicant traverses this rejection on the grounds that these references are defective in establishing a prima facie case of obviousness with respect to these claims.

Claim 1 was amended to incorporate the limitations of rejected dependent claim 2. Claims 2 and 16 were canceled. For this reason, the discussion will be directed to remaining amended independent claim 1.

Claim 1 now recites:

1. (Currently amended) A method of operating a frequency synthesizer, comprising:
  - detecting a phase difference between an output signal of a controlled oscillator and a reference signal, the output signal exhibiting a frequency and phase;
  - pumping first charge, in response to the phase difference, into a first filter which is configured as a direct path loop filter;
  - pumping second charge, in response to the phase difference, into a second filter having substantially the same topology as the first filter, the second filter being configured as an integrating path loop filter; ~~and~~
  - providing a signal from the first and second filters to the controlled oscillator to control the frequency and phase of the output signal of the controlled oscillator; and
  - decoupling the controlled oscillator from the first filter while first charge is pumped into the first filter.

The Lee '160 and Maldonado '197 references are defective in establishing a prima facie case of obviousness with respect to the above amended claim.

As the PTO recognizes in MPEP § 2142:

*... The examiner bears the initial burden of factually supporting any prima facie conclusion of obviousness. If the examiner does not produce a prima facie case, the applicant is under no obligation to submit evidence of nonobviousness...*

It is submitted that, in the present case, the Office Action has not factually supported a prima facie case of obviousness for the following, mutually exclusive, reasons.

**1. Even When Combined, the References Do Not Teach the Claimed Subject Matter**

The Lee '160 and Maldonado '197 patents cannot be applied to reject claim 1 under 35 U.S.C. § 103 which provides that:

*A patent may not be obtained ... if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains ... (Emphasis added)*

Thus, when evaluating a claim for determining obviousness, all limitations of the claim must be evaluated. However, since neither Lee '160 nor Maldonado '197 teaches "decoupling the controlled oscillator from the first filter while first charge is pumped into the first filter" as recited in amended claim 1, it is impossible to render the subject matter of claim 1 as a whole obvious, and the explicit terms of the statute cannot be met.

Thus, for this mutually exclusive reason, the examiner's burden of factually supporting a *prima facie* case of obviousness has clearly not been met, and the rejection under 35 U.S.C. §103 should be withdrawn.

**2. Prior Art That Teaches Away From the Claimed Invention Cannot be Used to Establish Obviousness**

In the present case the Maldonado '197 reference, by filtering "the phase error signal with a first filter subcircuit when a first switch is activated " and filtering "the phase error signal with a second filter subcircuit with a second enable switch is activated" shows that their system is directed to substituting or changing one filter subcircuit for another when he changes operating frequencies or modes. (See Maldonado's Fig. 5.) Thus, this system methodology clearly teaches away from applicant's amended claim 1

recited above which claims "decoupling the controlled oscillator from the first filter while first charge is pumped into the first filter".

Since it is well recognized that teaching away from the claimed invention is a *per se* demonstration of lack of *prima facie* obviousness, it is clear that the Office Action has not borne the initial burden of factually supporting any *prima facie* conclusion of obviousness.

Thus, for this reason alone, the examiner's burden of factually supporting a *prima facie* case of obviousness has clearly not been met, and the rejection under 35 U.S.C. §103 should be withdrawn.

### **3. The Combination of References is Improper**

Assuming, *arguendo*, that none of the above arguments for non-obviousness apply (which is clearly not the case based on the above), there is still another, mutually exclusive, and compelling reason why the Lee '160 and Maldonado '197 patents cannot be applied to reject claim 1 under 35 U.S.C. § 103.

§ 2142 of the MPEP also provides:

*...the examiner must step backward in time and into the shoes worn by the hypothetical 'person of ordinary skill in the art' when the invention was unknown and just before it was made.....The examiner must put aside knowledge of the applicant's disclosure, refrain from using hindsight, and consider the subject matter claimed 'as a whole'.*

Here, neither Lee '160 nor Maldonado '197 teaches, or even suggests, the desirability of the combination since neither teaches the specific arrangement of "decoupling the controlled oscillator from the first filter while first charge is pumped into the first filter" as specified above and as claimed in amended claim 1.

Thus, it is clear that neither patent provides any incentive or motivation supporting the desirability of the combination. Therefore, there is simply no basis in the art for combining the references to support a 35 U.S.C. § 103 rejection.

In this context, the MPEP further provides at § 2143.01:

*The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.*

In the above context, the courts have repeatedly held that obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination.

In the present case it is clear that the examiner's combination arises solely from hindsight based on the invention without any showing, suggestion, incentive or motivation in either reference for the combination as applied to claim 1. Therefore, for this mutually exclusive reason, the examiner's burden of factually supporting a *prima facie* case of obviousness has clearly not been met, and the rejection under 35 U.S.C. §103 should be withdrawn.

Independent claim 11 is believed to be allowable for reasons similar to those described above. Dependent claims 3-5 and 13-16 are believed to be allowable as depending on the allowable subject matter of their respective independent claims. For all these reasons, it is thus respectfully requested that the rejection of claims 1, 3-5, and 13-16 under 35 U.S.C. §103 be withdrawn.



Claims 21-40 are rejected under 35 U.S.C. §103 as being unpatentable over Lee, et al. (U.S. 6,781,424), hereafter Lee '424, in view of Lee '160 and Maldonado '197. Applicant traverses this rejection on the grounds that these references are defective in establishing a prima facie case of obviousness with respect to these claims.

Claim 21 was amended to incorporate the limitations of rejected dependent claim 22. Claim 31 was amended to incorporate the limitations of rejected claim 32. Claims 22 and 32 are canceled.

Claim 21 now recites:

21. (Currently amended) A wireless communication system, comprising:

- a frequency synthesizer including:

- a controlled oscillator;

- a phase detector that detects a phase difference between an output signal of the controlled oscillator and a reference signal, the output signal exhibiting a frequency and phase;

- a charge pump, coupled to the phase detector, that pumps first charge at a first charge pump output and second charge at a second charge pump output outputs;

- a direct path loop filter, coupled to the first charge pump output and the controlled oscillator;

- an integrating path loop filter, coupled to the second charge pump output and the controlled oscillator, the integrating path loop filter having substantially the same topology as the direct path loop filter;

- the direct path loop filter and the integrating path loop filter providing a signal to the controlled oscillator to control the frequency and phase of the output signal of the controlled oscillator, the direct path loop filter including a first switch that decouples the direct path loop filter from the controlled oscillator while the charge pump pumps first charge into the direct path loop filter; and

- a mixer circuit, coupled to the frequency synthesizer, to mix an input signal with

the output signal of the controlled oscillator of the frequency synthesizer.

As stated on page 5 of the Office Action, the Lee '424 reference does show a single chip transceiver including a PLL, mixer and filter system. However, the Lee '424, Lee '160 and Maldonado '197 references are defective in establishing a prima facie case of obviousness with respect to amended claim 21.

As the PTO recognizes in MPEP § 2142:

*... The examiner bears the initial burden of factually supporting any prima facie conclusion of obviousness. If the examiner does not produce a prima facie case, the applicant is under no obligation to submit evidence of nonobviousness...*

It is submitted that, in the present case, the Office Action has not factually supported a prima facie case of obviousness for the following, mutually exclusive, reasons.

**1. Even When Combined, the References Do Not Teach the Claimed Subject Matter**

The Lee '424, Lee '160 and Maldonado '197 patents cannot be applied to reject claim 21 under 35 U.S.C. § 103 which provides that:

*A patent may not be obtained ... if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains ... (Emphasis added)*

Thus, when evaluating a claim for determining obviousness, all limitations of the claim must be evaluated. However, since neither Lee '424, Lee '160 nor Maldonado '197 teach "the direct path loop filter including a first switch that decouples the direct path loop filter from the controlled oscillator while the charge pump pumps first charge

into the direct path loop filter,” as recited in amended claim 21, it is impossible to render the subject matter of claim 21 as a whole obvious, and the explicit terms of the statute cannot be met.

Thus, for this mutually exclusive reason, the examiner’s burden of factually supporting a *prima facie* case of obviousness has clearly not been met, and the rejection under 35 U.S.C. §103 should be withdrawn.

## **2. The Combination of References is Improper**

Assuming, arguendo, that none of the above arguments for non-obviousness apply (which is clearly not the case based on the above), there is still another, mutually exclusive, and compelling reason why the Lee ‘424, Lee ‘160 and Maldonado ‘197 patents cannot be applied to reject claim 1 under 35 U.S.C. § 103.

§ 2142 of the MPEP also provides:

*...the examiner must step backward in time and into the shoes worn by the hypothetical ‘person of ordinary skill in the art’ when the invention was unknown and just before it was made.....The examiner must put aside knowledge of the applicant’s disclosure, refrain from using hindsight, and consider the subject matter claimed ‘as a whole’.*

Here, none of Lee ‘424, Lee ‘160 or Maldonado ‘197 teach, or even suggest, the desirability of the combination since none of these references teach the specific arrangement of “the direct path loop filter including a first switch that decouples the direct path loop filter from the controlled oscillator while the charge pump pumps first charge into the direct path loop filter” as specified above and as claimed in amended claim 21. Moreover, none of these references teach a “direct path loop filter” and an “integrating path loop filter” as set forth in applicant’s amended claim 21.

Thus, it is clear that none of these patents provides any incentive or motivation supporting the desirability of the combination. Therefore, there is simply no basis in the art for combining the references to support a 35 U.S.C. § 103 rejection.

In this context, the MPEP further provides at § 2143.01:

*The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.*

In the above context, the courts have repeatedly held that obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination.

In the present case it is clear that the examiner's combination arises solely from hindsight based on the invention without any showing, suggestion, incentive or motivation in either reference for the combination as applied to claim 21. Therefore, for this mutually exclusive reason, the examiner's burden of factually supporting a *prima facie* case of obviousness has clearly not been met, and the rejection under 35 U.S.C. §103 should be withdrawn.

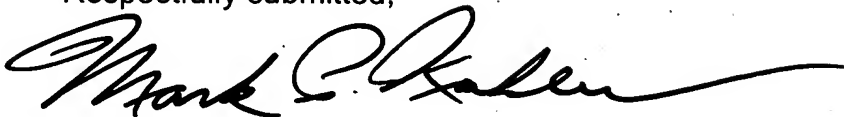
Independent claim 31 is believed to be allowable for reasons similar to those described above. Dependent claims 23-30 and 33-40 are believed to be allowable as depending on the allowable subject matter of their respective independent claims. For all these reasons, it is thus respectfully requested that the rejection of claims 21-40 under U.S.C. §103 be withdrawn.

## **Conclusion**

It is clear from all of the foregoing that independent claims 1, 11, 21, 31 and 41 are in condition for allowance. Dependent claims 3-10, 13-20, 23-30, 33-40, 46 and 47 depend from and further limit independent claims 1, 11, 21, 31 and 41 and are therefore allowable as well.

An early formal notice of allowance of claims 1, 3-11, 13-21, 23-31, 33-41, 46 and 47 is requested.

Respectfully submitted,



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